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Procedia Engineering 43 (2012) 76 – 81

Procedia Engineering

www.elsevier.com/locate/procedia

International Symposium on Safety Science and Engineering in China, 2012 (ISSSE-2012)

Occupational Injury Occurrence and Related Risk Factors among Chinese Migrant Workers

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Abstract

To study occupational injury occurrence and related risk factors among Chinese migrant workers, 650 migrant workers across 3 cities are surveyed with questionnaires utilizing convenience sampling design. Logistic regression model is adopted to determine the effect of individual factors, occupational training and working on occupational injury of migrant workers. Results show that 69.82% of respondents suffer from occupational injury. Occupational injury among migrant workers is subject to individual, safety training and working factors. Occupational training substantially reduces the occurrence of occupational injury. Male workers are more prone to occupational injury than females. Labour contract curtails occupational injury. Labour authorities are advised to enhance supervision over migrant worker-concentrated enterprises to ensure the provision of occupational training and labour contract, with a focus on male workers and migrant workers with more than 10-years working history.

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Keywords: Occupational injury; Migrant workers, Occupational training, Labor contract

1. Introduction

Nowadays, economy has maintained rapid growth in China, attracting worldwide attention. However, occupational health, as an important part of social progress, is lagging behind economic growth. The occupational health of migrant workers is particularly worrisome. According to the State Administration of Work Safety, nearly 70 million people, most of whom migrant workers die or become handicapped due to occupational injuries every year. In migrant workers-concentrated enterprises such as coal production businesses, each year more than 6,000 people are killed by occupational injuries. [1] Occupational injuries not only bring economic losses and emotional trauma to migrant workers and their families, but also huge economic burden to the society. [2-4] It is imperative to make in-depth analysis of occupational injury and related risk factors among Chinese migrant workers. Identification and control of risk factors would reduce occupational injuries among migrant workers and improve their occupational health, thereby achieving coordination of social and economic development.

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doi:10.1016/j.proeng.2012.08.014

2. Occupational injury occurrence and related risk factors among Chinese migrant workers

All According to International Labor Organization and World Health Organization, occupational health is meant to promote and maintain the physical, psychological, and social wellbeing of the workers of all occupations, prevent hazardous working conditions, and protect workers from occupational risks. [5] In short, protecting workers from occupational injury is the most basic requirement of occupational health.

Western countries are among the earliest to study occupational injury and related risk factors. Most research examines the relationship between social environment and occupational injuries. [6-7] Some studies used a broader framework, taking into account the social environment and social structure as well as the physical environment and genetic factors, [8-9] Others also incorporates the feelings of the people on the environment. [10-12] Risk factors include: (1) Individual factors, including gender, age, original health status and lifestyle. (2) Environmental factors, including toxic and hazardous substances and noise. (3) Social factors, such as work experience, educational, and occupational training. [13-17]

Currently, occupational health of migrant workers has become an unavoidable social problem and received nationwide attention. Existing studies revealed a poor occupational health status among migrant workers. According to the statistics of State Administration of Work Safety, nearly 70 million people--most of whom migrant workers die or become handicapped due to occupational injuries every year. In migrant workers-concentrated enterprises such as coal production businesses, each year more than 6,000 people are killed by occupational injuries. Risk factors include: (1) Working environment. The Chinese Academy of Social Sciences surveyed 2,398 migrant workers in five cities, including Dalian, Shanghai, Wuhan, Shenzhen and Chongqing. The survey shows that labor protection of migrant workers is very weak. 53.7% of respondents work in a poor environment with either toxic dust, or noise or humid. 11.3% of respondents said that they had difficulty in bending, walking and climbing stairs. [18] (2) Working time. The Chinese Academy of Social Sciences found that 36.5% of migrant workers rest less than a day per week. 45.2% work over 8 hours per day. (3) Legitimate rights and interests of migrant workers cannot be guaranteed. For migrant workers who do not sign labor contracts, in case of work injuries, employers can take quite limited responsibilities, and therefore, they tend to ignore occupational health of workers. A survey in Hangzhou revealed that 41.7% of respondents did not sign labor contracts and were not aware of the need to sign labor contracts. [19] According to the Ministry of Labor and Social Security's survey of 40 cities, only 12.5% of migrant workers signed labor contracts. [20]

Most current research in China adopted qualitative methods. Thus, in this research, 650 migrant workers across 3 cities are surveyed with questionnaires utilizing convenience sampling design. Logistic regression model is adopted to determine factors associated with occupational injury from the viewpoint of individual, occupational training and working.

3. Research methods

3.1. Respondent

The survey was conducted in 2011; Guangzhou, Beijing and Wuxi were chosen as representative cities. Regarding data acquisition location, the flow of migrant workers was considered as the principle, and eastern China was chosen. Based on the partition in each city and the concentration of migrant workers, samples were taken in each district.

3.2. Survey methodology

A uniform questionnaire was used to conduct the survey and the questionnaire includes individual information of migrant workers, employment information, safety training, work-related injuries, etc. In order to ensure the consistency of the questions and answers, and to avoid the error due to individual understanding, questionnaire was designed in a one-to-one way and questions were asked and recorded by trained interviewers.

3.3. Statistical methods

Logistic regression analysis was conducted using the STATA 10.0 after descriptive analysis.

3.4. Sample description

There are 650 survey questionnaires and 560 questionnaires are valid, including 241 from Guangzhou, 194 from Beijing and 125 from Wuxi.

Most previous studies are qualitative research and the limited quantitative studies rarely use rigorous social science

statistical methods. In view of this, 650 migrant workers across 3 cities are surveyed with questionnaires utilizing convenience sampling design. Logistic regression model is adopted to determine factors associated with occupational injury from the viewpoint of individual, occupational training and working.

The condition of migrant workers interviewed is described in Table 1. It can be seen from Table 1 that the occupational health of migrant workers is not optimistic, 69.82% of the respondents suffered work-related injuries during work, and only 30.18% of the respondents did not suffer work-related injuries.

Table 1. Sample Description

Variables	Categories	Population	Percentage（%）
Whether suffer red occupational injury	Yes	391	69.82
	No	169	30.18
Gender	Male	382	68.21
	Female	178	31.79
Age	30 years or younger	304	54.29
	31 to 45 years	203	36.25
	Older than 45 years	53	9.46
Education	Primary school and below	98	17.50
	Junior middle school	258	46.07
	High school	106	18.93
	Vocational school	65	11.60
	College and above	8	1.43
Industry	Construction	128	22.86
	Manufacture	107	19.11
	Catering	100	17.86
	Retail	48	8.57
	Other	177	31.61
Job	Worker	202	36.07
	Attendant	146	26.07
	Manager	75	13.39
	Technician	54	9.64
	Other	83	14.83
Whether signed labour contract	Neither oral or written contract	334	59.64
	Written contract	181	32.32
	Oral contract	45	8.04
Whether received occupational training	Yes	258	46.07
	No	302	53.93
Years working out of hometown	Less than 1 year	18	3.21
	1 year to 3 years (not included)	141	25.18
	3 years to 5 years (not included)	129	23.04
	5 years to 10 years (not included)	141	25.18
	10 years and longer	131	23.39
Average working hours per day	8 hours and less	195	34.82
	8 hours(not included) to 10 hours	196	35.00
	10 hours (not included)to 12 hours	130	23.21
	More than 12 hours	39	6.96
Average working days per week	5 days and below	70	12.50
	5 (not included)to 6 days	5	0.89
	More than 6 days	485	86.61
Total		560	100

From the individual point of view, male migrant workers outnumber their female counterparts; Migrant workers tend to be younger, and the workers under the age of 30 accounts for 54.29%; the educational level of migrant workers is generally low, with nearly 90 percent finishing only high school or below. From the viewpoint of employment, 22.86% of the respondents are working in construction industry, which is followed by manufacturing, accommodation and catering industry; 36.07% of the respondents are general production staff, which is followed by general service staff, taking up 26.07%. The majority of respondents (59.64%) did not sign a labour contract, and the majority of migrant workers worked for more than 1 year. The average daily working hours are generally rather long and only 34.82% of the respondents work less than eight hours a day. 35% of the respondents work 8-10 hours per day, and 30% respondents work more than 10 hours a day. The number of average weekly working days is generally rather long, only 12.50% respondents work no more

than 5 days a week and 86.61% of the respondents work more than six days. Migrant workers received poor safety training, with 53.93% of the respondents receiving no occupational safety training.

Table 2. Description of Variables

Variable		Description	
Independent variables	*Sa1*: dummy variable	Whether the respondent has taken occupational training? Yes=1，No=0	
	En1: dummy variable	Whether the respondent has signed labour contract? Yes=1，No=0	
	En2: categorical variable. Each categorical variable is treated as dummy variable	Industry of respondents (set "construction" as reference group)	0=Construction 1=Manufacture 2=Catering 3=Retail 4=Other
	En3: categorical variable. Each categorical variable is treated as dummy variable	Job of respondents (set "workers" as reference group)	0=Worker 1=Attendant 2=Manager 3=Technician 4=Other
	En4: categorical variable. Each categorical variable is treated as dummy variable	Average working hours of respondents per day(set "8 hours and less" as reference group)	0=8 hours and less 1=8 hours(not included) to 10 hours 2=10 hours(not included)to 12 hours 3=More than 12 hours
	En5: categorical variable. Each categorical variable is treated as dummy variable	Average working days of respondents per week(set "5 days and below" as reference group)	0=5 days and below 1=5 (not included)to 6 days 2=More than 6 days
	En6: categorical variable. Each categorical variable is treated as dummy variable	Years of working outside hometown of respondents(set "1 year to 3 years" as reference group)	0=Less than 1 year 1=1 year to 3 years (not included) 2=3 years to 5 years (not included) 3=5 years to 10 years (not included) 4=10 years and longer
	Indi1: dummy variable	Gender of respondents	0=Male 1=Female
	$Indi_2$: categorical variable. Each categorical variable is treated as dummy variable	Age of respondents (set "30 years or younger" as reference group)	0=30 years or younger 1=31 to 45 years 2=Older than 45 years
	$Indi_3$: categorical variable. Each categorical variable is treated as dummy variable	Education of respondents (set "primary school and below as reference group")	0=Primary school and below 1=Junior middle school 2=High school 3=Vocational school 4=College and above
Dependent variable	*Jobinjur*: dummy variable	Whether the respondent had occupational injury? Yes=1，No=0	

4. Analysis of occupational injury related risk factors

4.1. Model selection and variable description

Dependent variable is the occurrence of occupational injury indicated by *jobinjur*. Independent factors include individual, working and occupational training factors (See format 1).

$$Ln(\frac{P_{jobinjur}}{1-P_{jobinjur}}) = \beta_0 + \beta_k Sa_k + \beta_i En_i + \beta_t Indi_t + \varepsilon \quad (1)$$

Please see Table 2 for specific description of variables in format (1).

Table 3. Coefficient of Independent Variables

Variable		Odds Ratio	dy/dx	P>|z|
Whether the respondent has taken occupational training?		0.55	-0.12	0.00
Whether the respondent has signed labour contract?		0.99	-0.08	0.03
Industry of respondents (set "construction" as reference group)	1=Manufacture	1.08	0.01	0.79
	2=Catering	0.66	-0.09	0.32
	3=Retail	1.03	0.00	0.92
	4=Other	1.04	0.00	0.88
Job of respondents (set "workers" as reference group)	1=Attendant	0.82	-0.04	0.52
	2=Manager	1.11	0.02	0.74
	3=Technician	0.99	0.00	0.98
	4=Other	1.67	0.09	0.12
Average working hours of respondents per day(set "8 hours and less" as reference group)	1=8 hours(not included) to 10 hours	0.90	0.10	0.69
	2=10 hours(not included)to 12 hours	0.93	0.15	0.79
	3=More than 12 hours	1.32	0.14	0.51
Average working days of respondents per week(set "5 days and below" as reference group)	1=5 (not included)to 6 days	2.55	0.20	0.42
	2=More than 6 days	1.75	-0.02	0.06
Years of working outside hometown of respondents(set "1 year to 3 years" as reference group)	1=1 year to 3 years (not included)	1.75	-0.01	0.30
	2=3 years to 5 years (not included)	2.37	0.05	0.11
	3=5 years to 10 years (not included)	2.15	0.15	0.16
	4=10 years and longer	3.11	0.12	0.04
Gender of respondents	1=Male	1.67	0.10	0.02
Age of respondents (set "30 years or younger" as reference group)	1=31 to 45 years	0.72	-0.67	0.21
	2=Older than 45 years	0.44	-0.18	0.02
Education of respondents (set "primary school and below as reference group")	1=Junior middle school	1.08	0.01	0.78
	2=High school	1.55	0.08	0.21
	3=Vocational school	0.85	-0.03	0.69
	4=College and above	0.70	-0.07	0.48

4.2. Regression results

Samples without missing independent or dependent variable were classified as valid samples, and as figure 2 shows, a total of 558 valid samples are analyzed. Logistic regression analysis is conducted based on format (1) to reveal influence coefficient of each independent variable on the dependent variable. Regression results are shown in Table 3. If $p <= 0.05$, the result is considered as significant; if p-value> 0.05, the results is considered as insignificant. Results shows: ① after control of work and occupational training variables, gender has significant influence on the occurrence of occupational injury. Compared to females, the likelihood of occupational injury is 10% higher for male migrant workers. Age also has a significant effect. Compared to respondents under the age of 30, the likelihood of occupational injury is 18% lower among respondents over the age of 45. For respondents of other age groups, there is no significant difference. ② with control of individual variables and work variables, the likelihood of occupational injury is increased by 12% among respondents with no occupational training. ③with control of the individual and training variables, the likelihood of occupational injury is 11% higher for respondents with a longer working history. Compared to the respondents who did not sign labor contracts, respondents who signed a labor contract is 8% less likely to suffer occupational injury. ④ Industry, job, working hours per day and working days per week have no significant effect on the occurrence of occupational injury.

5. Conclusion

According to survey results, ①Occupational training is the biggest contributor to the reduction of occupational injuries among migrant workers. The chances of occupational injury are 12% higher among respondents who receive no occupational training. ② Working years is the second most influential risk factor. The likelihood of occupational injury is 11% higher for respondents with longer working years. ③ Labour contract also has significant influence on occupational injury. Compared to the respondents who did not sign labour contracts, those who signed a contract is 8% less likely to suffer occupational injury. ④ Gender has significant effect on occurrence of occupational injury. Compared to females, the likelihood of occupational injury is 10% higher for male migrant workers. Age also has a significant effect. Compared to respondents under the age of 30, those over the age of 45 are 18% less likely to suffer occupational injury.

In view of the status and risks related to occupational injury, the following policy proposals are made: ①Labor authorities are advised to enhance supervision over migrant worker-concentrated businesses to ensure access to occupational training, with a focus on workers under 30. Occupational training should include: job safety, labor rules and regulations, safety performance and operation procedures of machinery and electrical equipment, previous accidents, dangerous parts and components, toxic items and control, labor protection supplies, etc. Educational should be tailored to the need of specific industry and job position. Assessment of occupational training should be conducted after a period of training. To enrich safety training activities, knowledge contest, film and television education, photo exhibition and other forms should be applied to improve safety awareness of migrant workers. ② Labor departments and trade unions should urge businesses to sign labor contracts with migrant workers and to prioritize working conditions, occupational safety and health. Labor laws should be improved to regulate employers to fulfill their obligations to protect legitimate rights and interests of migrant workers. ③Male workers with more than 10-years working history should be paid special attention in their provision of medical insurance or medical aid. In case of occupational injury, they should enjoy relevant compensation.

Acknowledgements

I would like to thank Wang Bin and Nie Jia for their contribution to this work.

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